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The Strategic Role of Supermarket Buyer Intermediaries in New Product Selection: Implications for Systemwide Efficiency

by

Edward W. McLaughlin and Vithala R. Rao

WP-14 March 1989

WORKING PAPER SERIES

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THE STRATEGIC ROLE OF SUPERMARKET BUYER INTERMEDIARIES IN NEW PRODUCT SELECTION: IMPLICATIONS FOR SYSTEMWIDE EFFICIENCY

Although the management and organizational theory literature is rich in its treatment of internal firm behavior, relatively little of this work has penetrated mainstream economic analysis. This situation is part of the general neglect by economists and agricultural economists of management strategy and conduct as pointed out by Marion, Leibenstein, Shaffer among others. To the extent that economic behavior has been studied, however, it has been through the work of industrial organization (IO) economists and, specifically, their work with the structure-conduct-performance (S-C-P) paradigm (e.g., Scherer). However, Henderson and Marion have noted that IO theory rarely explicitly considers the firm decision environment, neither at manufacturer or distributor levels. Recently, several researchers (e.g., Westgren and Cook, Rogers and Caswell) have identified internal firm decision-making and strategic behavior as a high priority research area. Ultimately, if improvements in systemwide efficiency are to be achieved, a better understanding of internal firm decision making is required.

THE RESEARCH CONTEXT

Increase in new grocery product introductions (alternatively, product proliferation) represents a economic phenomenon where a better understanding of firm behavior (conduct) is essential to improving systemwide efficiency. Indeed, product proliferation has been widely cited as one of the major modes of competitive conduct by leading

grocery manufacturers (Padberg and Westgren, Connor, Zellner). In 1988, estimates of the number of new products, including both fundamentally new products derived from new technologies and line extensions (e.g., new flavors or package sizes) ranged as high as 10,558 (Gorman). This number is more than twice the 1970-81 annual average (Gorman). The resources required to support this yearly influx of new products are enormous for the entire grocery system. Although aggregate data on costs of new product introductions are not available, selected references on individual product introductions suggest that industry-wide totals are staggering. Fortune, for example, reports a total development expenditure of $1.5 billion by the Proctor and Gamble Company to introduce a single product, its Ultra-Pamper diaper, to U.S. supermarkets; $1 billion of this was spent on advertising alone.

Although overall retail store sizes have continued to grow, the relative space allocated to dry groceries has been constant or declining over the last five years (Progressive Grocer, October 1987). Wholesale and retail companies simply do not have physical or financial capacity to accommodate all of the new products, so choices have to be made. Because many products, probably the majority (Progressive Grocer, November 1987), do not gain entry into the supermarket system, large economic losses are incurred by manufacturers as well as intermediary firms.

To maximize both distributive efficiency and the probability of new product acceptance, manufacturers require an intimate knowledge of buyers' behavior, not just at consumer levels but at the pivotal channel intermediary (i.e., supermarket buyer) levels as well. Economic theory suggests that manufacturers should make allocations of a predetermined

budget for a new product to various components of the new product's marketing plan to equalize marginal returns. To exercise this optimality criterion, manufacturers need better information regarding the characteristics of new products that are most important to buyers in their accept/reject decisions. Further, information is needed on those characteristics of products that are likely to assure consumer acceptance in the marketplace.

Against this background, this paper develops logistic regression models to formalize the channel intermediary's conduct and decision processes regarding new product introductions by manufacturers. The effects of various components of manufacturers' conduct (e.g., marketing strategies) on new product selection decisions are estimated. Further, the status of accepted new products after a period of time was also examined to understand the differences between the intermediary's acceptance and marketplace acceptance. The implications of these analyses for systemwide efficiency are discussed.

LITERATURE REVIEW

Past research of new product introductions may be separated into those with a public policy orientation and those with a managerial perspective. In the former group, the common conceptual theme has been the S-C-P paradigm using secondary sources of data. Some relevant studies in this stream are those by Adams and Yeller, who studied the similarity of new products, Schmalensee, who identified new product proliferation as an explicit manufacturer strategy to erect entry barriers and Scherer, who estimated the welfare effects of new product introductions. Conner has investigated relationships between

manufacturer market structure and the number of new products (for elaboration of these studies, see Conner et al.). As in much of the structure-performance literature, the emphasis on the conduct dimension in these studies, especially of the intermediary-buyer, is minimal.

However, there is a valuable strain of literature that examines new product acceptance from a strategic managerial perspective. Grashof, for example, found that product newness turned out to be the most important criterion in a single product category, dog food, when attempting to evaluate hypothetical performance outcomes. Heeler et al. in studying a limited data base, concluded that the procurement function could be made more efficient by simply eliminating those products that did not even merit marginal evaluation. Montgomery modeled buyer reaction to hypothetical products and while certain of his findings were consistent with a priori expectations--e.g., advertising support was a significant predictor of product acceptability--he pointed to the cumbersome nature of his analytical models for larger data sets.

Thus, past efforts to evaluate new product introductions have relied either on secondary data involving limited numbers of categories, simulated experiments, strictly theoretical approaches, or buyer reaction to hypothetical products. Only modest attempts have been made to investigate the intermediary conduct of the supermarket headquarters buyer. Yet the strategic decisions made by this link between manufacturer and consumer are key to developing total system efficiency improvement. Finally, the most recent empirical studies (Scherer and Connor) were both conducted on data collected from the 1970s. Given the surge of new products over the past decade and their increasing economic

importance, research on this important strategic activity using primary data is required.

BUYER-SELLER CONDUCT

Although various typologies of new products may be cited (e.g., Connor), new products in this paper refer to all items new to the channel intermediary including new flavors, new sizes and new brands. National brand manufacturers cite a number of reasons to justify the proliferation of new products including: to maintain interest of channel intermediaries and consumers, to extend an item to an adjacent product-space in an effort to attract incremental business, to take advantage of new technologies and changes in consumer demand, to counter competitive thrusts or to pre-empt competition, to transform a commodity to a higher margin value-added item, and to partially ensure against high new product failure rates.

Despite the key role played by new products in manufacturer marketing strategies, their proliferation imposes considerable costs on other channel members (e.g., wholesalers and retailers) and consumers. Retail organizations, for example, although often attracted to new products by the lure of additional profit opportunities, must also face substantial costs associated with new products such as personnel costs in evaluating new products (Hamm), costs of entry and maintenance of new data, and other costs associated with inventory control and handling, specialized wholesale and retail space requirements, and production of shelf signs. Finally, new products impose substantial direct and indirect costs on consumers. These latter costs come in the form of higher search and information processing costs (e.g., potential

confusion regarding new products' characteristics and availability) and higher prices.

The above discussion points to the importance of the channel intermediary's decision making process to the performance of the total grocery system. Yet past research has not shed much light on whether, or in what ways, the intermediary's role enhances efficiency or inhibits it. As manufacturers develop new products at a more rapid rate than intermediaries can accommodate them, neoclassical notions of consumer sovereignty initiating efficient decisions may break down if the intermediary becomes the arbitor of consumer choice. Moreover, it appears possible that manufacturer inducements, such as couponing, billing allowances and free goods, are more important to the buyer than inherent product quality. These propositions are critical to grocery system resource allocation and efficiency.

THE SUPERMARKET INTERMEDIARY'S INITIAL ACCEPTANCE MODEL

The conceptual model guiding our analysis of the behavior of the supermarket buyer to accept or reject a new product is presented in Figure 1. This approach elaborates the often neglected "black box"

Insert Figure 1 Here
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or conduct dimension of manufacturer-distributor exchanges, specifically relating to new product behavior. Scherer (1980) suggested that conduct has not received adequate research attention primarily due to the difficulty of quantification and the lack of researcher access to the requisite data. This study attempts to remedy both of these traditional constraints.

Our conduct model implies that a new product's acceptance and, ultimately, system efficiency and performance, is a function first of manufacturer and distributor structure (e.g., firm numbers and size distribution), including their organizational characteristics (e.g., chain versus wholesaler), and subsequently of the strategies and decision making procedures of both sets of firms. For example, subsequent to the generation of a new product idea, a prototype is developed and modified through various phases of R&D activity and consumer research before an initial marketing strategy for the item is established by the manufacturer. The new item may then be presented to the buyer/intermediary. Effectively, the buyer evaluates the new product's likely demand and profit potential (modeling of buyer's judged profit potential has been reported in McLaughlin and Rao) based on the information (e.g., marketing strategy) presented by the manufacturer. The strategy variables typically include price and other financial incentives (e.g., margin structure, credit, forward-buy provisions), promotional factors (e.g., coupons, in-store signage), advertising campaigns, various aspects (e.g., taste, appearance) of the new product and, often, certain non-price incentives (e.g., free goods, delivery scheduling, slotting allowances).

A number of opportunities for contact and negotiation between manufacturer and distributor occur during this process: distributors may at times initiate the idea of developing a new item with a manufacturer based on perceived market demand; manufacturers sometimes make use of buyer judgment as a proxy for a test market or often share results of any preliminary test marketing for retailer reaction; manufacturers frequently alter certain marketing strategy variables

(especially non-price incentives) based upon the suggestions made by the retailers. Thus our conceptual model depicts the critical transmittal of information vertically, between manufacturer and retailer (intermediary), as well as the decision-making that takes place internal to each firm.

Finally, often after repeated contacts with the supplier, the buyer makes a recommendation to a buying committee. This committee normally consists of senior executives constituted to represent the firm's diverse interests. The buying committee, nearly always acting in accordance with the buyer's recommendation, makes the final decision. This paper models the interaction between manufacturer and retailer (intermediary) that leads to the final accept/reject decision.

After review of the above literature and numerous meetings with the participating intermediary a large number of factors was identified that appear to play influential roles in manufacturers' new product introductions to distributors. In Table 1, we have grouped the relevant variables into four categories: financial, competition, marketing strategy and other. These variables are, in effect, both the objective and subjective measures of conduct--the give-and-take negotiation process--between manufacturer and distributor suggested in Figure 1. Further, we have hypothesized the direction of influence of each variable on the intermediary's decision to accept a new product; the reasoning behind most of those hypotheses is straightforward. However, brief explanations are provided below.

Insert Table 1 Here

We hypothesize the gross margin and profit variables to be only weakly positive since although high profits are generally viewed by buyers as positive attributes, sometimes gross profits are set at high levels only to cover required, but perhaps burdensome, tasks to be performed by retailers. In these latter cases, high gross margins (not profits) may negatively influence new product acceptance. Similarly, high profits may indicate high prices that could dampen consumer demand. Thus, the sign on profits is positive, but with a question mark because of the possible high prices associated with high profits. Conversely, the sign on gross margin is positive but with a question again, this time because a high gross margin may not yield a high profit.

The opportunity cost variable is expected to have a negative influence on buyers' likelihood to accept a new product the greater the minimum dollars required to order the product. Competition was broken into two parts: firms and brands. As the number of competing firms who already carry the item increased, we expected a positive relationship with buyer acceptance. In essence, a vigilant buyer is likely to be favorably influenced by a positive evaluation of the new item by a competing firm. On the other hand, we hypothesized that as the number of already existing national brands and private label products that competed for limited shelf space with this item increased that the likelihood of buyer acceptance decreased.

We developed a series of measures to describe manufacturer marketing strategies. Generally, we expected positive relationships with these strategy variables under the control of the vendor. For example, we expected that as the score on product uniqueness (that is, a composite variable combining buyer judgments of product quality,

performance and package design) increased that buyers would be more likely to accept the product. The reasoning for the other strategy variables was similar with the exception of one type of trade variable, bill back provisions. Many retailers find it cumbersome to have to "bill back" the manufacturer for allowances after having complied with certain performance requirements. The transaction costs of the paperwork are not trivial. Hence, we hypothesized that this particular term of trade would negatively influence acceptance.

Finally, new products in fast growing product categories are expected to be accepted with higher probabilities by channel intermediaries. A new item's synergy, the association with a family of existing products, is hypothesized to negatively impact acceptance probability. The reasoning here again was based on physical space limitation: intermediaries are less likely to add line extensions to already existing products.

Since the choice variable is dichotomous (accept or reject), the acceptance probability for a new product can modeled by the familiar logistic function:

$$P_j = \frac{1}{1 + \exp(-a - \underset{\sim}{b}'\underset{\sim}{X}_j)} \tag{1}$$

where:

P_j = probability of acceptance of the j-th item by the channel intermediary;

$\underset{\sim}{X}_j$ = (px1) vector of descriptors measured for the j-th item;

$\underset{\sim}{b}$ = (px1) vector of parameters; and

a = an intercept term.

The logistic regression model in equation (1) is estimated by maximum likelihood methods. The LOGIST procedure developed by Walker and Duncan and implemented in the SAS package (Harrell) is suitable for this purpose and utilized here.

Empirical Study

In accordance with our conceptual model of manufacturer-distributor conduct, data were collected from a large supermarket chain chosen to exemplify the typical organization for evaluating new products. The chain is publicly held, covers a large trading area with approximately 100 stores in the Northeastern U.S. and its 1988 sales approached $1 billion. The chain's headquarters region is one frequently employed by manufacturers for test marketing due to the representativeness of its consumer profiles and market area. It is highly unlikely that any food manufacturer would bypass this firm in the introduction of a new product. Hence, although the model developed here only applies to one company, the representativeness of the firm may permit a cautious generalization of the results to other market conditions.

Two types of primary data were collected from the chain: (a) vendor supplied materials including product physical characteristics (e.g., case cubic dimensions), financial information (e.g., suggested retail price, gross margin), and promotional support (e.g., television ads, couponing), and (b) a one-page questionnaire completed by each buyer assessing their judgements of qualitative attributes (e.g., taste, quality, performance) for every new item. Several variables employed in the model were computed from the data (see Table 1). The data were

collected for about 2,000 products on a weekly basis from June, 1986 to February, 1987.

Intermediary's Acceptance Rates: The overall acceptance rate for new products presented to this chain was 29.0%. However, significant variation exists in the rates of acceptance by product category (e.g., at the extremes, 21% for canned foods to 61% for pet products) and by suggested retail price of the item (27% for items priced less than $1.00 to 39% for items over $2.00). Further, consistent with prior expectations, acceptance rate steadily grew as the levels of marketing or promotional support (television advertising and coupons) increased: 24% of products with no promotional support were accepted, 41% with limited support (either coupons or TV) and 46% with high levels (coupons and TV) of promotional support.

Some past studies (e.g., Connor) suggest that total promotional support is likely to be highly correlated with the size of the firm offering the new product to the channel. Unfortunately, our attempt to collect additional data on manufacturer size, using total sales as a measure, was not completely successful, due in major part to the large number of privately held firms for which data were not published. Nonetheless, for the available data, the acceptance rate was 41.3% for firms with annual sales over $700 million, 28.6% for firms with sales between $2 and 700 million and 29.2% for firms with sales under $2 million. Thus results from past studies were corroborated for the largest firm category but were less consistent for the smaller firm categories.

Analysis Method: Unfortunately, nearly 50% of the collected data was not analyzed in this model due to incompleteness of some of the variables. However, a sample of the product profiles from the incomplete data set was analyzed and was not significantly different from the profiles in the complete data set. The complete data were divided randomly into two subsamples for analysis and validation; the validation data constituted about 1/3 of the total sample. The major analysis consisted of building logistic regression models for all categories of items, for subgroups of items with several levels of marketing support and for groups of items of different price ranges. Analyses for subgroups of items were conducted to account for the inherent heterogeneity among the various categories of products. In all of these models, the product category variations are accounted for by a set of dummy variables.

RESULTS

Structure and Fit of the Overall Model: The logistic regression model fits the data extremely well. The predictive accuracy exceeds 78%, much higher than that expected by chance. Additionally, the model correctly predicted 72% of the decisions in the validation sample.

The estimated coefficients for the variables for the logistic model for the total analysis sample are shown in Table 2. The model chi-square is highly significant. Further, the coefficients of the majority

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Insert Table 2 Here
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of the variables are in the predicted direction. The variables of product uniqueness, expected category growth, and number of competing

retail firms show positive and significant effects. The variable bill-back terms of trade shows negative and significant effect. These results are according to our hypotheses for the model. The only significant variable with sign contrary to our hypotheses is gross margin for which we had hypothesized a weak positive relationship. This finding is consistent with similar results of Montgomery (1975), however, who found that the relationship between new product acceptance and gross margin to be negative but not significant. The only other variables that appear with a contradictory sign were the remaining terms of trade factors, but their coefficients are not statistically significant.

Model Structure for Subgroups: The logistic model was also estimated for subgroups of items--by marketing support and by price. The model c^2 statistics are uniformly high. As could be expected, the classification accuracy (not shown here) improved for the various subgroups of items (due to greater homogeneity within a subgroup). For the sake of brevity, only the significant variables and their direction are shown in Table 3 for these subgroup models.

Insert Table 3 Here

The subgroup models revealed a number of differences from the overall model. First, for low priced items, as the intensity of vendor effort and profit per shelf volume increase, the probability of acceptance increases. Second, for medium and high price items, gross margin, vendor effort, and profit per volume cease to have significant influences on the accept/reject decision, however, both product quality

uniqueness and expected category growth show positive significant influences. In addition, the synergy dummy has a negative significant effect for high priced items. Third, product uniqueness measure is the only significant variable common to both highly supported and unsupported items. For highly supported items, opportunity costs (negative), expected category growth (positive), and both price dummies (negative) are significant, while for unsupported items, gross margin (negative), number of competing firms (positive), and vendor effort (positive) are significant indicators.

There is a considerable variation in the acceptance of new products by product category as presented in Table 4. In the sample as a whole, empirical acceptance rates are much higher for the categories of candy and gum, sauces, etc., and snacks, crackers and nuts. This table also shows the estimated probabilities of a new product acceptance for items comparable on all aspects but the product category for all items and for each subgroup of items. These estimates were calculated using a base of .33 for the "other" category, essentially to control for all aspects of

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Insert Table 4 About Here
---

the new item except the product category. Thus, they indicate the "true" differences among the product categories. These data show that for <u>all</u> items, household supplier and dairy foods have the lowest acceptance probabilities and items from candy and gum group have the highest acceptances. The rankings of categories changes when subgroups of items are examined. For example, for the highly supported items, dairy foods receive a much higher acceptance while candy and gum continue to enjoy highest acceptance. Other interesting differences include a nonmonotonic relationship between acceptance probability and

price of the new item for such categories as frozen foods, canned foods and sauces, spices, etc.

Finally, the coefficients of the models by firm size (not shown here) reveal notable differences in the slotting allowance variable. This variable was positive and significant for firms with total sales under $2 million but negative and significant for firms with sales between $100 million and $700 million. Interestingly, however, it is insignificant for firms larger than $700 million in sales.

BUYER ADAPTATION TO CONSUMER (MARKET) RESPONSE

The modeling results reported above describe the linkage between certain manufacturer strategies and supermarket buyer acceptance. However, to better understand the relationship of the buyer as the channel intermediary between the manufacturer and the consumer (or marketplace), additional data were collected from the participating retail firm on the status of the subset of all products accepted from the original set of products presented by vendors. Table 5 reports the status for these 549 products (29 percent). Out of the 549 accepted products, 31.9 percent (175 products) or 9.2 percent of the original sample presented, were still on the retail shelves selling well nearly two years after the initial vendor presentation. Although 69.1 percent of the products initially accepted by the buying organization were discontinued within the first two years, buyers reported a variety of reasons for this deletion decision. The three categories buyers most often cited were lack of consumer interest (45.3 percent of all deletions), expiration of manufacturer introductory allowances (12.9

percent) and the introduction of a superior competiting item (11.5 percent).

Table 5 also shows the profile of attributes present in the set of products initially accepted by the buying committee as compared to the profile of attributes (varibles) of the products that had ultimately been "accepted" by consumers (or by the market) after two years.[1] These comparisons show numerous differences between the attributes present in the group of products accepted by the buyer/intermediaries (buyer acceptance) and the group of products ultimately accepted by the marketplace (consumer acceptance). The last column in Table 5 is an index of the approximate efficiency with which the buying committee was able to predict consumer acceptance computed as the ratio of percent of products accepted by the buying committee and the percent of products "accepted" by consumers in the marketplace (after two years). Thus, this ratio is an approximate measure of the degree to which the buying committee (in the role of an agent for consumers) and consumers evaluate new products in an equivalent manner. A score of 1.00 indicates that

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Insert Table 5 About Here
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buyers were able to perfectly anticipate consumer's final judgment with respect to the importance of the selected attribute. An index greater (less) than 1.00 suggests that buyers "overestimated" ("underestimated") the importance of an attribute, at least as determined by the proportion of all the products ultimately accepted by the marketplace that exhibit this attribute. For example, of all products accepted by the buying committee, 21.7 percent had test market results presented to buyers as a part of vendors' new product presentation, however, 28.0 percent of the

successful products (i.e., still on shelves after two years) were those that had had such test market results originally presented. The resulting index, .78, suggests that buyers underestimated the importance of test market results in determining ultimate marketplace success.

The attributes for which the index is either very large or very small are pictorially shown in Figure 2. For example, products given

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Insert Figure 2 About Here
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high scores on product uniqueness by buyers do not necessarily gain consumer acceptance to the same degree (the index is 1.24 showing the possible inefficiency of the buying committee to predict consumer acceptance).

SYSTEMWIDE EFFICIENCY IMPLICATIONS

The model in this paper estimated the importance of the various components of a manufacturer's new product strategy in determining the acceptance of a new product by an individual supermarket intermediary. The statistical results are significant and the explanatory variables behaved generally as predicted. With knowledge of manufacturer new product budgets, calculation of marginal returns associated with various marketing mix factors becomes straightforward and optimum levels of manufacturer expenditures can be determined. Consequently, systemwide efficiency increases: theoretically, costs are more optimally allocated, profits can be higher for channel members and at the same time prices can be lower for consumers.

The lack of significant positive effects of certain terms of trade (e.g., slotting allowance and free cases) and, indeed, the significant

negative effect of others (e.g., bill back provisions) have several implications for total food system efficiency. Although this result appears contrary to certain of our conduct-model's prior expectations and contrary to much popular industry perception (see, for example, Supermarket News and New York Times), a possible hypothesis is that the presence of certain non-price incentives, like slotting allowances, may actually be correlated with inferior products. That is, suppliers may offer additional support for products they fear are not truly unique and, similarly, buyers may indeed recognize and accept truly superior products on their own merits without requiring additional inducements. In fact, when the buyers in the participating retail firm were confronted with this initially puzzling result, they corroborated that our hypothesis accurately described typical industry practice. Moreover, the attribute profile of products that had withstood the test of the marketplace--those selling well after two years--suggests that buyers apparently "overestimated" the importance of the slotting allowances (index = 1.38). The index indicates that a considerably smaller proportion of products that had slotting allowances were accepted by consumers than were initially accepted by buyers. This finding also suggests that buyers may initially accept products that are accompanied by slotting allowances, perhaps due to the financial incentive alone, only to discontinue them relatively sooner than competing new items without allowances.

Thus the implication is that much of the large and currently expanding manufacturer promotional allowances directed to the retail trade may be inefficient if not redundant. This study indicates that manufacturers may be better off by reallocating some of their new

product budgets into activities more likely to positively influence buyers and consumers both. However, this is not an easy prescription because, as this analyisis has shown, several of the strategy variables the most influential to buyers (e.g., product uniqueness and category growth) are apparently not weighted as heavily by consumers. That is, retail buyers make new product decisions, at least in part, on a different set of criteria than consumers. Better prediction by retail buyers of their own consumers ultimate product preference is likely to increase both firm (and system) efficiency by moving the firm (and industry) to an improved position(s) on its production function(s).

Data collection efforts in this research were somewhat disappointing in one sense, as various pieces of information were missing (e.g., number of coupons, dollar amounts of advertising, etc.) for a large number of items. This is not just a researcher problem; it is also a problem for channel intermediaries in their actual decision-making environments. It appears likely that information from vendors could be much improved by including, perhaps even standardizing, advertising and promotional materials, the format for discounting schedules, etc., in new product packets. Although some vendors may not initially embrace such a proposal due to feared loss of competitive advantage, overall results would undoubtedly eliminate duplication and waste thus increasing the efficiency of the entire system.

Finally, since our data show that a higher percentage of products were accepted when market research results were presented (39 percent of products with test marketing or marketing research results were accepted versus 28 percent acceptance rate for products without these results) one could hypothesize that, given the high marketing costs of test marketing a new item with consumers, manufacturers instead simply

introduce the item to the buyer first. In effect, the buyer, frequently in a better position to assess likely consumer demand than a manufacturer, may serve as a quick and inexpensive market test. In this sense, recent large numbers of new product introductions may not represent inefficient product proliferation, but an efficient manufacturer strategy to increase variety (and profit) while reducing systemwide costs.

Conclusions and Future Research

Although new product introductions have been widely cited as one of the major modes of conduct by grocery manufacturers, new products are likely to be an equally important strategic tool of distributors as well. Yet little research has probed the conduct of the retail buying teams, gatekeepers to the supermarket shelves, regarding how they decide to accept or reject the growing number of new product offerings. We are encouraged, based on this research experience with one company, that a richer complement of conduct or strategic variables can be incorporated into economic analysis to improve understanding of, and ultimately after further validation with other firms, to improve systemwide efficiency and performance. Further investigation is warranted into the finding only suggested in this research that buyers and consumers may use different sets of varaibles in evaluating new products.

One obvious direction of future research is to replicate this research to additional firms to probe such questions as: Why do certain firms chose particular organizational forms to evaluate new products?; What is the impact of these other forms (e.g., no committee) on the acceptance rates?; Whether some forms are more (less) efficient or more (less) beneficial for producers or consumers and to identify which

organizational forms enhance the success of manufacturer strategies. It might be shown, for example, that a reorganization of a distributor's buying process could result in lowering a firm's transaction costs and a probable improvement in system welfare.

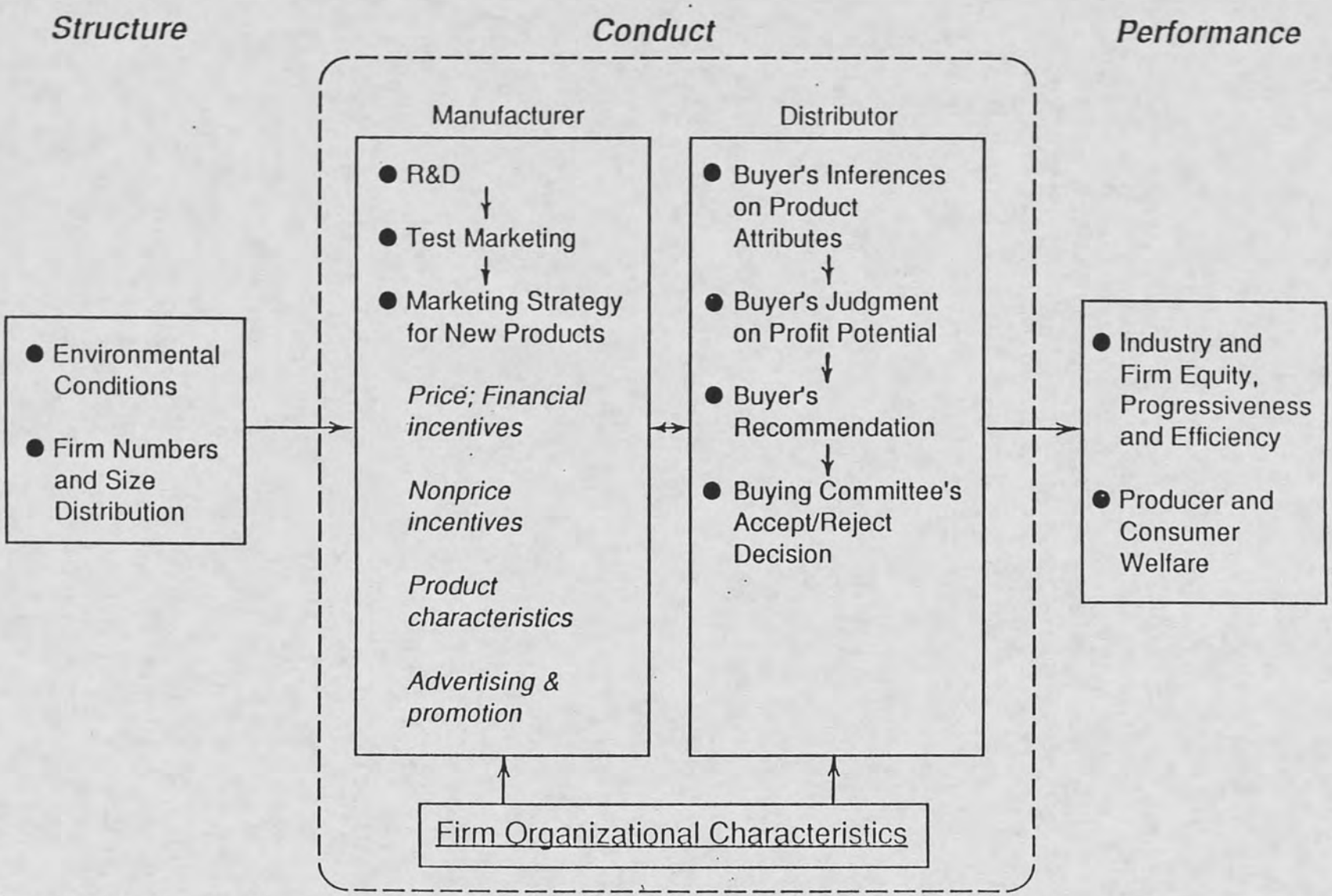
Similarly, certain intermediary organizations which evaluate new products exist in other channels (e.g., book stores and movie theaters) where many of the problems of new product selection decisions are parallel to the grocery channel. The existing firms in the grocery product system which track new product introductions (e.g., Marketing Intelligence Service, Ltd., and Gorman) do not provide adequate information idiosyncratic to each buyer's decision. Thus, opportunities exist for conducting comparative studies of the services of the information intermediaries for non-grocery product channels; the results may suggest opportunities for improving the efficiency of the grocery product channels.

An ideal next step in this research stream is to develop a societal balance sheet of costs and benefits due to the new product introduction activity in the food system. Various measurement questions arise in this endeavor. From the manufacturer's perspective, not only are assessments of costs of R&D and marketing effort needed, but also the opportunity costs of false introductions and early dismissal of likely successes need to be evaluated. Further, the importance of new products for the viability of the firms needs to be measured in monetary terms. Similar costs and benefits can be identified at the intermediary level. While one can debate the existence of any consumer benefits at all from new product proliferation, there appear to be ample research opportunities to increase the efficiency of the process.

Footnotes

1. A logistic regression model was also developed to examine the ability of the same set of varibles used in Table 2 for predicting the status (consumer acceptance) of the accepted products after two years. This model predicted correctly 73.5 percent of the time (less than the buyer acceptance model) and there was no overlap between the two sets of significant variables.

FIGURE 1. CONCEPTUAL APPROACH TO NEW PRODUCT CONDUCT[1]



[1]Feedback loops not shown here

Figure 2

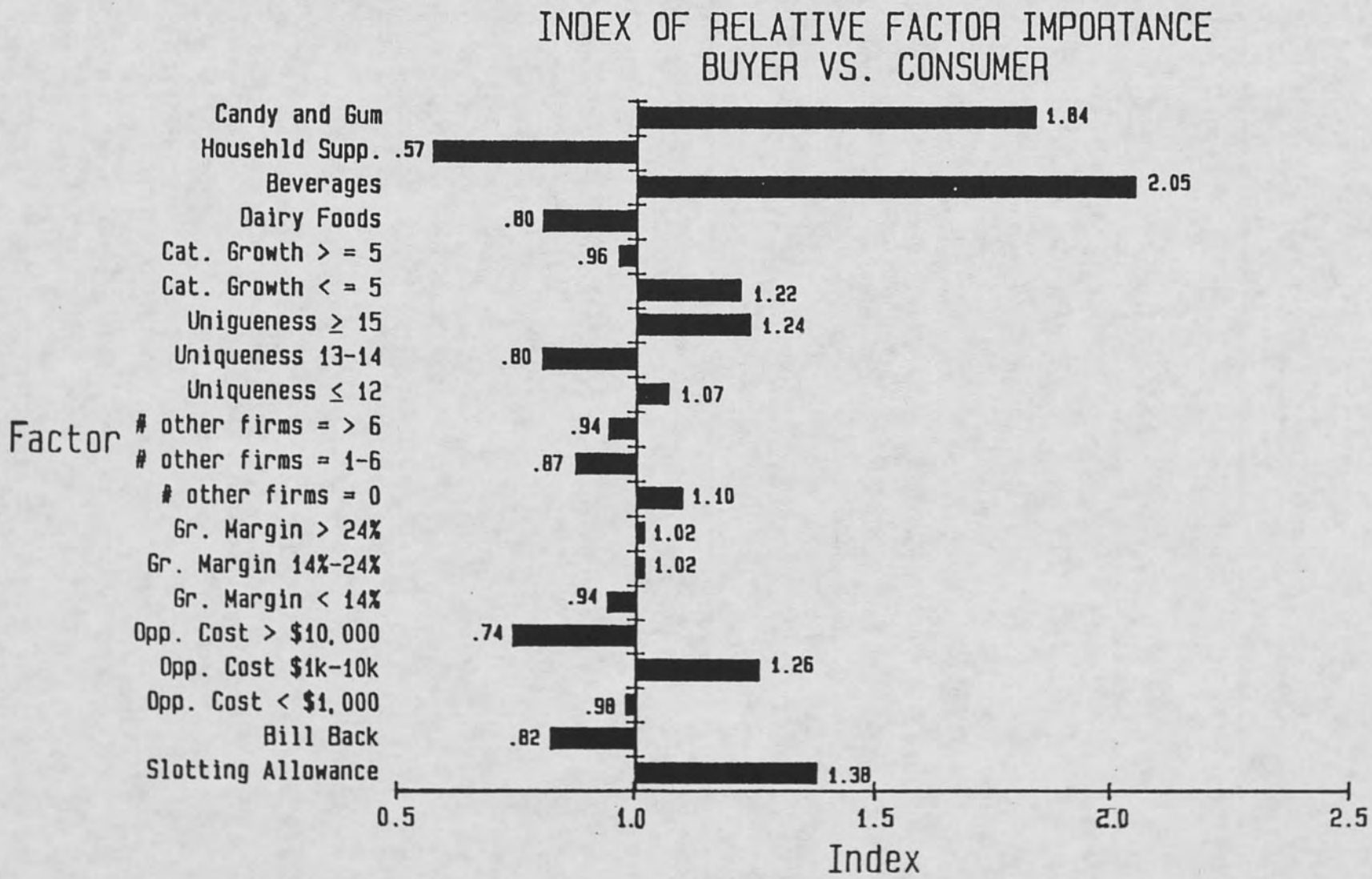

INDEX OF RELATIVE FACTOR IMPORTANCE
BUYER VS. CONSUMER
Factor
Candy and Gum 1.84
Househld Supp. .57
Beverages 2.05
Dairy Foods .80
Cat. Growth > = 5 .96
Cat. Growth < = 5 1.22
Unigueness ≥ 15 1.24
Uniqueness 13-14 .80
Uniqueness ≤ 12 1.07
other firms = > 6 .94
other firms = 1-6 .87
other firms = 0 1.10
Gr. Margin > 24% 1.02
Gr. Margin 14%-24% 1.02
Gr. Margin < 14% .94
Opp. Cost > $10,000 .74
Opp. Cost $1k-10k 1.26
Opp. Cost < $1,000 .98
Bill Back .82
Slotting Allowance 1.38
0.5
1.0
1.5
2.0
2.5
Index

Table 1

VARIABLES, OPERATIONALIZATION, SPECIFIC MEASURES AND HYPOTHESES

Category	Variable	Measure(s)	Hypothesized Direction of Influence on Buying Decision
FINANCIAL	GROSS MARGIN	Percentage gross margin	Positive (?)
	PROFIT	$ profit per cu. ft. of shelf volume	Positive (?)
	OPPORTUNITY COST	Dollars needed to meet min. order quantity	Negative
COMPETITION	FIRMS	Actual buyer determination of numbers of firms and brands	Positive
	BRANDS		Negative
MARKETING STRATEGY	PRODUCT UNIQUENESS (Quality and Package)	Buyer judgments on 0-10 scales (sum)	Positive
	VENDOR EFFORT	Buyer judgments on 0-10 scales (sum)	Positive
	MARKETING SUPPORT	Three categories --no, partial and high support	Positive
	TERM OF TRADE	Dummy variables	Positive or negative
	PRICE	Two dummy variables for low and medium prices	Positive (?)
OTHER	CATEGORY GROWTH	Index of buyer judgments on 0-10 scales	Positive
	SYNERGY	Whether item is a member of a family (0,1)	Negative

Table 2

RESULTS OF LOGISTIC REGRESSION FOR TOTAL SAMPLE
(ACCEPT/REJECT DECISIONS)

GROUP OF ITEMS VARIABLE	ALL ITEMS
INTERCEPT	-5.47(41.92)*
GROSS MARGIN	-0.06(10.30)*
PROFIT PER SHELF VOLUME	0.004(3.24)+
OPPORTUNITY COST	-0.001(1.14)+
NUMBER OF COMPETING FIRMS	0.14(11.72)*+
NUMBER OF COMPETING BRANDS	-0.03(1.89)+
PRODUCT UNIQUENESS (QUALITY)	0.25(18.03)*+
VENDOR EFFORT [a]	.03(0.46)+
TERMS OF TRADE DUMMIES:	
OFF-INVOICE	-0.19(0.70)+
SLOTTING ALLOWANCE	-0.43(2.03)+
BILL BACK	-0.93(6.04)*+
FREE CASES	-0.22(0.87)
LOW PRICE DUMMY	-0.17(0.30)
MEDIUM PRICE DUMMY	0.02(0.01)+
EXPECTED CATEGORY GROWTH	0.68(46.49)*+
SYNERGY DUMMY	-0.31(2.01)+
PRODUCT CATEGORY DUMMIES[b]	(NOT SHOWN)
NUMBER OF OBSERVATIONS	687
MODEL CHI-SQUARE, D.F.	249.49, 23
P-VALUE	0.0

NOTE: ENTRIES ARE COEFFICIENT AND CHI-SQUARE FOR EACH VARIABLE (with 1 d.f.)

* Significant at 0.05 level.
\+ Sign of the coefficient is according to expectations.
a The marketing support variable is in this buyer judgmental variable.
b The relative differences on estimated acceptance probability of product categories are shown in Table 4.

Table 3

SIGNIFICANT VARIABLES FOR LOGISTIC REGRESSION
FOR SELECTED SUBGROUPS OF ITEMS
(ACCEPT/REJECT DECISIONS)

SUBGROUP OF ITEMS	SIGNIFICANT VARIABLES	SIGN OF RELATIONSHIP	NUMBER OF OBSERVATIONS	MODEL CHI-SQUARE; D-F, P-VALUE
Low Priced Items ≤ $1.00	Gross Margin	-	237	90.61; 21
	Profit/Shelf Volume	+		0.0
	Vendor Effort	+		
Medium Priced Items $1.00 - $2.00	Number of Competing Firms	+	289	128.06; 21
	Product Uniqueness	+		0.0
	Slotting Allowances	-		
	Bill Back	-		
	Expected Category Growth	+		
High Priced Items ≥ $2.00	Number of Competing Firms	+	161	117.75; 21
	Product Uniqueness	+		0.0
	Expected Category Growth	+		
	Synergy Dummy	-		
Unsupported Items	Gross Margin	-	194	120.87; 23
	Number of Competing Firms	+		0.0
	Product Uniqueness	+		
	Vendor Effort	+		
Highly Supported	Opportunity Cost	-	155	95.61; 23
	Product Uniqueness	+		0.0
	Low Price Dummy	-		
	Medium Price Dummy	-		
	Expected Category Growth	+		

Note: Price variable was described by three categories shown above and dummy variables were used in the model for the low and medium categories.

Table 4

PRODUCT CATEGORY SPECIFIC PROBABILITIES
IN THE LOGISTIC MODELS OF ACCEPT/REJECT DECISIONS

PRODUCT CATEGORIES	EMPIRICAL ACCEPTANCE RATE (%)	Illustrative Acceptance Probabilities for Comparable Items For					
		ALL ITEMS	UNSUPPORTED ITEMS	HIGHLY SUPPORTED ITEMS	LOW PRICED ITEMS	MEDIUM PRICED ITEMS	HIGH PRICED ITEMS
FROZEN FOODS	33.0	0.133	0.011	0.084	0.395	0.035	0.084
CANNED FOODS	21.1	0.208	0.053	0.411	0.463	0.096	0.510
DAIRY FOODS	28.0	0.098	0.002	0.453	0.228	0.010	0.080
BEVERAGES	28.3	0.112	0.296	0.000*	0.000*	0.180	0.096
HOUSEHOLD SUPPLIES	29.1	0.066	0.006	0.000*	0.024	0.035	0.018
SAUCES, SPICES, CONDIMENTS, OILS, DRESSINGS	43.8	0.174	0.147	0.397	0.550	0.040	0.451
CANDY & GUM	43.4	0.390	0.053	0.772	0.606	0.143	0.244
SNACKS, CRACKERS & NUTS	43.4	0.165	0.059	0.110	0.001	0.112	0.086
OTHERS	28.2	0.330	0.330	0.330	0.330	0.330	0.330

*These estimates are very close to zero due to a very large (but insignificant) coefficient for the dummy variable of the corresponding product category.

Table 5

COMPARISON OF PROFILES OF NEW PRODUCTS ACCEPTED BY BUYING COMMITTEE VERSUS ACCEPTED BY CONSUMERS (MARKETPLACE), TWO YEARS AFTER INTRODUCTION, BY MAJOR ATTRIBUTE

Variable/ Attribute		Products Introduced Total	Buying Committee Acceptance	Consumer (Market) Acceptance	Index of Buying Committee Acceptance to Consumer Acceptance
Number of Products		1899	549 (29.0%)	175 (31.9%)	0.91
Test Market Results	YES	322	21.7%	28.0%	0.78
	NO	1577	78.3	72.0	1.09
Market Research	YES	642	46.3	46.3	1.00
	NO	1257	53.7	53.7	1.00
Terms of Trade					
Slotting Allowance	YES	258	14.2	10.3	1.38
	NO	1641	85.8	89.7	0.96
Off Invoice Allowance	YES	1186	68.5	70.3	0.97
	NO	713	31.5	29.7	1.06
Free Cases	YES	501	27.9	30.9	0.90
	NO	1398	72.1	69.1	1.04
Bill Back	YES	204	8.9	10.9	0.82
	NO	1695	91.1	89.1	1.02
Financial					
Profit/Cube <= $3.00		1218	56.1	61.1	0.92
Profit/Cube > $3.00		681	43.9	38.9	1.13
Opportunity Cost < $1000		1101	64.3	65.7	0.98
Opp. Cost $1000 - $10,000		596	25.1	20.0	1.26
Opp. Cost > $10,000		202	10.6	14.3	0.74
Gross Margin < 14%		403	18.8	20.0	0.94
Gross Margin 14% - 24%		441	27.9	27.4	1.02
Gross Margin > 24%		1054	53.4	52.6	1.02
Competition					
# Competing Firms = 0		984	50.5	45.7	1.10
# Competing Firms = 1 - 6		367	18.9	21.7	0.87
# Competing Firms > 6		547	30.6	32.6	0.94
# Competing Brands = 0		975	58.7	57.1	1.03
# Competing Brands > 5		924	41.4	42.9	0.96

Table 5 (continued)

Variable/ Attribute		Products Introduced Total	Buying Committee Acceptance	Consumer (Market) Acceptance	Index of Buying Committee Acceptance to Consumer Acceptance
Product Characteristics					
Uniqueness <= 12		1159	39.0	36.6	1.07
Uniqueness 13 - 14		449	32.6	40.6	0.80
Uniqueness >= 15		291	28.4	22.9	1.24
Vendor Effort <= 10		1039	35.3	34.9	1.01
Vendor Effort 11 - 13		604	37.5	35.4	1.06
Vendor Effort >= 14		256	27.1	29.7	0.91
Retail Price < $1		830	36.8	39.4	0.93
Retail Price $1 - $2		648	33.5	37.7	0.89
Retail Price > $2		421	29.7	22.9	1.30
Categ. Growth <= 5		848	17.5	14.3	1.22
Categ. Growth >= 6		1051	82.5	85.7	0.96
Synergy	YES	1071	50.8	52.0	0.98
	NO	828	49.2	48.0	1.02
Product Categories:					
Frozen Foods		385	22.5	26.4	0.85
Canned Foods		241	8.2	8.1	1.02
Dairy Foods		207	8.2	10.3	0.80
Beverages		184	8.2	4.0	2.05
Household Supplies		110	4.6	8.1	0.57
Sauces, Spices, Etc.		104	7.1	5.8	1.24
Candy & Gum		116	9.5	5.2	1.84
Snacks, Crackers, Etc.		87	3.3	4.0	0.82
Other		700	28.3	28.2	1.01

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